PARTICIPATION OF UNITED STATES PRESIDENT JIMMY CARTER IN THE NRX REACTOR RECONSTRUCTION AT CHALK RIVER, 1952-53.

THE ACCIDENT TO THE NRX REACTOR OCCURRED FRIDAY AFTERNOON DECEMBER 12, 1952. THE NRX 30-MEGAWATT HEAVY WATER RESEARCH REACTOR WAS SEVERELY DAMAGED. THE ALUMINUM SHEATHING AND TUBES WHICH SEPARATED THE HEAVY WATER, AIR AND COOLING-WATER SYSTEMS MELTED. FISSION PRODUCTS FROM LONG IRRADIATED URANIUM WERE CARRIED BY A LOAD OF WATER INTO THE BASEMENT. THE CORE VESSEL OF THE REACTOR AND THE TUBES OF THE CALANDRIA WERE SEVERELY DAMAGED AND HAD TO BE REMOVED SO THAT A NEW VESSEL AND EQUIPMENT COULD BE INSTALLED.

U.S. PARTICIPATION AND ASSISTANCE IN THE NRX OPERATION WAS A JOINT EFFORT OF THE PERSONNEL OF USAEC LIAISON OFFICE, THE NUCLEAR POWER DIVISION, USN, THE U.S. NAVAL RADIOLOGICAL DEFENSE LABORATORY, THE ELECTRIC BOAT DIVISION, AND THE U.S. NAVAL MILITARY PERSONNEL FROM KNOLLS ATOMIC POWER LABORATORY AND USAEC, IDAHO OPERATIONS OFFICE.

A PROGRESS REPORT (9 FEBRUARY TO MARCH 2, 1953) NOTES THE RESPONSIBILITIES OF THE ON-SITE PERSONNEL, AS WELL AS TOTAL MAN DAYS ON SITE.

(A) USNRDL, M. B. HAWKINS, OINC; 15 MEN, 140 MAN-DAYS; OVERALL COORDINATION, LOAN OF DECONTAMINATION EQUIPMENT, TRAINING OF AECL PERSONNEL IN USE OF EQUIPMENT, DECONTAMINATION OF LOWER HEADER ROOM, TECHNICAL COORDINATION OF DISASSEMBLY OPERATIONS, COORDINATION OF MISCELLANEOUS RECOVERY OPERATIONS.

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(B) ELECTRIC BOAT DIVISION, H. F. BAIER, OINC; 17 MEN, 65 MAN-DAYS; DISASSEMBLY OF HEADERS, REMOVAL OF MISCELLANEOUS EQUIPMENT.

(C) KAPL, J. E. CARTER, JR., LT., USN, OFFICER-IN-CHARGE; 13 MEN, 47 MAN-DAYS; DISASSEMBLY OF HEADERS; REMOVAL OF MISCELLANEOUS EQUIPMENT.

(D) USAEC, IDAHO OPERATIONS OFFICE, J. NICHOLSON, LT., USN, OINC; 14 MEN, 70 MAN-DAYS; DISASSEMBLY OF HEADERS, DECONTAMINATION AND REMOVAL OF THERMAL SHIELD, CLEANUP OF HEADER ROOM.

THE REMOVAL OF THE HEADERS WAS ACCOMPLISHED BY U.S. NAVY MILITARY PERSONNEL ATTACHED TO KNOLLS ATOMIC POWER LABORATORY AND USAEC, IDAHO OPERATIONS OFFICE, AND BY CIVILIAN PERSONNEL OF THE ELECTRIC BOAT COMPANY. THE OPERATION WAS COORDINATED BY USNRDL PERSONNEL. MR. BAIER OF ELECTRIC BOAT PLANNED THE TOOLING AND THE ACTUAL METHODS USED FOR THE DISASSEMBLY. MESSRS. BAIER, CARTER, AND NICHOLSON PROVIDED THE DIRECT SUPERVISION OF THEIR RESPECTIVE GROUPS. THE HEADERS WERE DISCONNECTED PRIMARILY BY UNBOLTING, THE ONLY BURNING OPERATIONS BEING THOSE REQUIRED ON THE CENTER STUDS WHEN THE NUTS WERE JAMMED BY WELDS. SINCE THE "THERMOHM" LEADS WERE EASY TO DECONTAMINATE, THEY WERE DISASSEMBLED RATHER THAN CUT. THE COPPER TUBING PRESSURE LEADS WERE CUT AND THE ELBOWS BROKEN ON THE ORIFICE PIPES TO ALLOW MORE RAPID DISASSEMBLY. IN LOCATIONS WHERE STUCK RODS REMAINED IN THE VALVES, THE VALVES WERE REMOVED FROM THE HEADER BEFORE THE HEADER WAS DROPPED. AFTER REMOVAL OF THE HEADERS TO THE OUTER BASEMENT ROOM, THEY WERE SLUNG ON A HOIST FOR REMOVAL BY AECL PERSONNEL. THE OPERATIONS WERE SCHEDULED SO THAT FOUR MEN

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WORKED AT A TIME. THE WORK PERIOD VARIED FROM ONE-HALF HOUR TO ONE AND ONE-QUARTER HOURS, DEPENDING UPON THE REQUIREMENTS OF THE DIRECT SUPERVISION. HOWEVER, THE FINAL CONSENSUS WAS THAT TWO FORTY-FIVE MINUTE WORK PERIODS PER DAY WERE PROBABLY OPTIMUM FOR SUCH STRENUOUS WORK WHEN PERFORMED WEARING GAS MASKS AND PROTECTIVE CLOTHING OF THE TYPE REQUIRED.

THE OPERATION PROCEEDED MORE RAPIDLY THAN ANTICIPATED DUE TO THE SKILL AND EFFORT OF THE REMOVAL PERSONNEL AND TO THE LOWER RADIATION LEVEL ALLOWING THEM TO BECOME ACCUSTOMED TO THE JOB. THE ACTUAL REMOVAL OF THE HEADERS REQUIRED APPROXIMATELY 60 MAN HOURS, AN AVERAGE OF 1.8 MAN HOURS FOR EACH OF THE 33 HEADERS. THE TOTAL DOSAGE UTILIZED WAS ABOUT 50 R OR 1.5 R PER HEADER.

TABLE I

KAPL:

J.E. CARTER, JR.
C.S. CARLISLE
R.L. ANDERSON
L.A. BERKEY
R.A. BEARHOPE
A.N. DUNN
F. HIEBER, JR.
R. ROBERTSON
C.B. SHELDON
D. TRIMBLE
J.T. WILLIAMS
M.W. TUCKER
A.V. McKEON

LT. CARTER WAS ACCEPTED FOR SUBMARINE DUTY IN THE SUMMER OF 1948 AND WAS POSTED TO NEW LONDON, CONNECTICUT. IN 1949, THE U.S. NAVY MADE A COMMITMENT TO DEVELOP A NUCLEAR PROPULSION PLANT FOR SHIPS AND THEN CONTRACTED WITH TWO MAJOR COMPANIES TO BUILD PROTOTYPE ATOMIC-POWERED SUBMARINES. WESTINGHOUSE BEGAN THEN TO BUILD THE POWER PLANT FOR THE SUBMARINE NAUTILUS AND GENERAL ELECTRIC BEGAN TO CONSTRUCT THE POWER PLANT FOR THE SEA WOLF.

AFTER A SCREENING INTERVIEW WITH THEN-CAPTAIN RICKOVER, LT. CARTER WAS ORDERED TO SCHENECTADY, NEW YORK AS SENIOR OFFICER OF THE CREW OF THE SEA WOLF. HE TAUGHT MATHEMATICS, PHYSICS AND REACTOR TECHNOLOGY. AT THE SAME TIME, HE HELPED THE GENERAL ELECTRIC WORKERS TO CONSTRUCT THE PROTOTYPE POWER PLANT WITHIN A HUGE SPHERE NEAR KNOLLS ATOMIC POWER LABORATORY. DURING THIS TIME, LT. CARTER AND A FELLOW OFFICER STUDIED SPECIAL GRADUATE COURSES IN REACTOR TECHNOLOGY AND NUCLEAR PHYSICS AT UNION COLLEGE.

THE CREW OF THE SEA WOLF TRAVELLED A LOT FROM SCHENECTADY, NEW YORK TO AEC HEADQUARTERS IN WASHINGTON, D.C. TO THE HANFORD WORKS IN WASHINGTON STATE AND TO IDAHO WHERE THE NAUTILUS PROTOTYPE WAS BEING BUILT AND EXPERIMENTAL REACTORS WERE OPERATED.

AT THE TIME OF THE CHALK RIVER INCIDENT THE CREW WAS ASKED TO GO TO THE CANADIAN SITE TO HELP IN DISASSEMBLING THE DAMAGED NUCLEAR REACTOR CORE.

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BY JIMMY CARTER
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